AMENDED CLAIMS

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Claims

1. Device for packaging products having a head and a stick, such as lollipops, in wraps, comprising a frame including first supply means for supplying the products, second means for supplying a web of wrapping material, means for cutting a wrap from the web, a wrapping station having a driven series of means for retaining the products and circulating in a first direction about a horizontal shaft, and a drum driven in the same direction having means for enveloping the product heads with a wrap and means for securing the wrap on the products, the wrapping station comprising a supply station and a discharge station, the second supply means being positioned for supplying the web of wrapping material according to a path that is tangential to the drum, in a direction running along with the drum rotation.

2. Device according to claim 1, the second supply means being positioned for substantially vertical supply.

3. Device according to claim 2, the retaining means and the drum being driven for carrying out a substantially downward motion at the location of the supply station.

4. Device according to any one of the preceding claims, furthermore provided with a discharge station for discharge of the packaged products from the retaining means, the discharge station being placed at the location of the upper side of the drum.

5. Device according to any one of the preceding claims, the second supply

means being adapted for continuous supply of the web of wrapping material.

6. Device according to claim 5, the second supply means and the means for driving the drum being adjustable to each other for causing the web speed of the web of wrapping material to be equal to the circumferential speed of the drum at the location of the retaining means.

7. Device according to claim 5 or 6, the second supply means comprising a pair of drive rollers and a servo motor for the driving thereof.

8. Device according to any one of the preceding claims, furthermore provided with means for detecting markings on the web of wrapping material, such as a photocell, means for measuring the web speed, as well as with means for determining the actual distance between the markings based on the data of the detection means and the measuring means and means for adjusting the drive of the web of wrapping material to the determined actual distance between the markings.

9. Device according to claim 8, the cutting means being positioned stationary, but adjustable in the transport direction of the web, preferably at half a wrap length upstream from a radial plane through the drum perpendicular to the transport direction of the web.

10. Device according to claim 8 or 9, the drive of the cutting means being synchronisedly coupled to the drive means for the drum, so that the cutting means run in register with the retaining means etc. on the drum.

11. Device according to claim 10, an encoder being provided on the cutting means or on the drive means for the drum, and the encoder being coupled to a control unit for mutual adjustment to the control of the driving of the web of wrapping material.

12. Device according to any one of the preceding claims, the drum being provided with means for gripping the product head after the product head has been enveloped with a wrap, and with means for rotating the head gripping means during securing the wrap on the product by the securing means, which gripping means have two pairs of opposite arms.

13. Device according to any one of the preceding claims, the securing means comprising heat welding arms that are also part of the enveloping means and forming a kind of diaphragm in there, the drum furthermore being provided with means for moving the heat welding arms from a first position in which they define a passage for the product head and a second position in which the wrap is secured by heat welding, the heat welding arms being provided with welding heads, that are connected to a power source by means of bendable conductive strips, preferably copper strips.

14. Device according to claim 13, the conductive strips being multiple circumferentially bent.

15. Device according to claim 13 or 14, the conductive strips forming torsion springs.

16. Device according to claim 13, 14 or 15, the conductive strips being conductively connected to conductors that are stationary with the drum.

17. Device according to claim 16, the conductive strips being connected to conductors that are stationary with the drum at a location between the strip ends and at the ends being connected to members stationary with the heat welding arms.

18. Device according to any one of the claims 13-17, two bendable conductive strips being provided for each heat welding arm, which strips have been connected to both the exits of the power source, respectively,

the bendable conductive strips preferably being spaced apart in a direction transverse to the movement of the arm.

19. Device according to any one of the claims 13-18, the heat welding arms being positioned rotatable about their own arm shafts, preferably being rotatable about spaced apart shafts, preferably spaced apart in radial direction of the drum, both heat welding arms preferably being coupled to each other for simultaneous movement.

20. Device according to claim 19, the shafts of the respective heat welding arms being provided with inter-engaging teeth, one of the shafts being driven.

21. Device according to claim 20, the driven shaft being driven in the drum by means of leverage.

22. Device according to claim 16 and claims depending on claim 16, several heat welding arms arranged in the circumferential sense of the drum being attached to the stationary conductors.

23. Device according to claim 13-22, at least one of all heat welding arms being provided with means for measuring the welding temperature at the welding head, which measuring means have been connected to regulating means for the power source for the welding heads for delivering a respective measuring signal.

24. Device according to claim 23, the measuring means comprising a PT100 element on the heat welding arm.

25. Device according to claim 23 or 24 and claim 16, the measuring means comprising measuring conductors that have been attached to the stationary conductors in an insulated manner.

26. Device according to claim 23, 24 or 25, the measuring means being connected to the base of a heat welding arm having a fork-shaped welding head.

27. Device according to any one of the claims 23-26, of a pair of heat welding arms only one of the arms being provided with the measuring means.

28. Device according to any one of the claims 23-27, only one of the pairs of heat welding arms being provided with the measuring means.

29. Device for packaging products having a head and a stick, such as lollipops, in wraps, comprising a frame including first supply means for supplying the products, second means for supplying a web of wrapping material, means for cutting a wrap from the web, a wrapping station having a driven series of means for retaining the products circulating in a first direction about a horizontal shaft, and a drum driven in the same direction having means for enveloping the product heads with a wrap and means for securing the wrap on the products, the securing means comprising pairs of heat welding arms, that are also part of the enveloping means and forming a kind of diaphragm in there, the drum furthermore being provided with means for moving the heat welding arms between a first position in which they define a passage for the product head and a second position in which the wrap is secured by heat welding, the heat welding arms being provided with welding heads that are connected to a power source by means of bendable strips of conductive material, such as copper.

30. Device according to claim 29, the conductive strips being multiple circumferentially bent.

31. Device according to claim 29 or 30, the conductive strips forming

torsion springs.

32. Device according to claim 29, 30 or 31, the conductive strips being conductively connected to conductors that are stationary with the drum, preferably at a location between the strip ends and the strips preferably being connected at the ends to parts that are stationary with the heat welding arms.

33. Device according to any one of the claims 29-32, two bendable conductive strips being provided for each heat welding arm, which strips have been connected to both the exits of the power source, respectively, the bendable conductive strips preferably being spaced apart in a direction transverse to the movement of the arm.

34. Device according to any one of the claims 29-33, the heat welding arms being positioned rotatable about their own arms shafts, preferably both heat welding arms being rotatable about spaced apart shafts, preferably spaced apart at radial distance, both heat welding arms preferably being coupled to each other for simultaneous movement.

35. Device according to claim 34, the shafts of the respective heat welding arms being provided with inter-engaging teeth, one of the shafts being driven, the driven shaft preferably being driven in the drum by means of leverage.

36. Device according to claim 33 and claims depending on claim 33, several heat welding arms arranged in the circumferential sense of the drum being attached to the stationary conductors.

37. Device according to any one of the claims 29-36, at least one of all heat welding arms being provided with means for measuring the welding temperature at the welding head, which measuring means have been

connected to adjustment means for the power source for the welding heads for transmitting a respective measuring signal, the measuring means preferably comprising a PT100 element on the heat welding arm.

38. Device according to claims 33 and 37, the measuring means comprising measuring conductors that have been attached to the stationary conductors.

39. Device according to claim 37 or 38, the measuring means being connected to a heat welding arm with the base of a fork-shaped welding head.

40. Device according to claim 37, 38 or 39, of a pair of heat welding arms only one of the arms being provided with the measuring means.

41. Device according to any one of the claims 37-40, only one of the pairs of heat welding arms being provided with the measuring means.

42. Device according to any one of the preceding claims, the drum being provided with means for gripping the product head after the product head has been enveloped with a wrap, and with means for rotating the head gripping means during securing the wrap on the product by the securing means, the securing means comprising pairs of heat welding arms, that are also part of the enveloping means and forming a kind of diaphragm in there, the drum furthermore being provided with means for moving the heat welding arms from a first position in which they define a passage for the product head and a second position in which the wrap is secured by heat welding, the movement means being arranged at the same side of the drum as the rotation means for the gripping means, preferably at the outside of the drum and the frame.

43. Device according to claim 42, the drum comprising means for

screening the movement means and the rotation means from the space where the products are being packaged, which are situated at the side of the movement means and the rotation means facing away from the outside of the drum.

44. Device according to claim 44, the drum being hinged to the frame.

45. Device according to claim 45, provided with locking means for securing the drum to the frame in an operative position.

46. Device according to claim 46, the locking means comprising a bolt extending through the frame and the drum.

47. Device according to claim 46, the locking means on the drum comprising means that are active on pressure difference.

48. Device according to any one of the preceding claims, the first supply means furthermore comprising a number of consecutively positioned disks, that are consecutively driven oppositely, the disks being provided with receiving spaces for one stick each, and curved edge strips being positioned at the circumference of the disks for retaining the sticks in the receiving spaces.

49. Device according to claim 49, of each pair of consecutive disks a first disk at the circumference being provided with equal receiving spaces and the accompanying curved edge strip being adjustable with respect to the receiving spaces and a second disk at the circumference being provided with groups of receiving spaces of different sizes and the accompanying curved edge strips being stationary.

50. Device according to claim 50, the second disks being adjustable with respect to their driving shaft.

51. Device according to claim 51, the second disks being provided with indication means for the sizes of the different receiving spaces.

52. Device according to claim 52, the indication means being formed by calibration holes corresponding to common stick thicknesses.

53. Device according to any one of the claims 49-53, the second disks being provided with a circumferential edge having sawteeth, that are preferably oriented in downstream direction.

54. Device according to any one of the claims 49-54, the first supply means comprising a singling station, where the products are brought from a situation bulk into a singled situation, the disks being positioned for transport of the products from the singling station to the retaining means.

55. Device according to any one of the preceding claims, furthermore comprising a singling station for products supplied in a bulk, comprising a first discharge means for the products in bulk, a turning table assembly placed below it, and a second discharge means for the singled products, the turning table assembly comprising a distribution disk, positioned for rotation of the first discharge means to the second discharge means and in the circumferential area being provided with means for receiving the product heads, as well as a spreading disk placed within the circumferential area, that is oppositely driven and has a support surface for the products coming from the first discharge means and discharging them to the circumferential area of the distribution disk, the support surface being substantially flat.

56. Device according to claim 56, the spreading disk extending with an edge area over the circumferential area of the distribution disk.

57. Device according to claim 57, the edge area sloping radially to the

outside.

58. Device according to any one of the preceding claims, furthermore comprising a singling station for products supplied in bulk, comprising a first discharge means for products in bulk, a turning table assembly placed below it, and a second discharge means for the singled products, the turning table assembly comprising a distribution disk, which is positioned for rotating of the first discharge means to the second discharge means and in a circumferential area being provided with means for receiving the product heads, as well as a spreading disk placed within the circumferential area, that is oppositely driven and has a support surface for the products coming from the first discharge means and discharging them to the circumferential area of the distribution disk, the spreading disk at least partially being sunk into the distribution disk.

59. Device provided with one or more of the characterising measures described in the attached description and/or shown in the attached drawings.